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ABSTRACT OF THE DISCLOSURE

A projection exposure apparatus includes a projection optical system, which is arranged in an optical path between a first surface and a second surface, projects a pattern on a negative plate arranged on the first surface onto a workpiece arranged on the second surface and exposes the pattern thereon. The projection optical system includes a first imaging optical subsystem having a dioptric imaging optical system; a second imaging optical subsystem having a concave reflecting system; a third imaging optical subsystem having a dioptric imaging optical system; a first folding mirror arranged in an optical path between the first imaging optical subsystem and the second imaging optical subsystem; and a second folding mirror arranged in an optical path between the second imaging optical subsystem and the third imaging optical subsystem. The first imaging optical subsystem forms a first intermediate image and the second imaging optical subsystem forms a second intermediate image.